Water Agency Response During California's July 2006 Heat Storm

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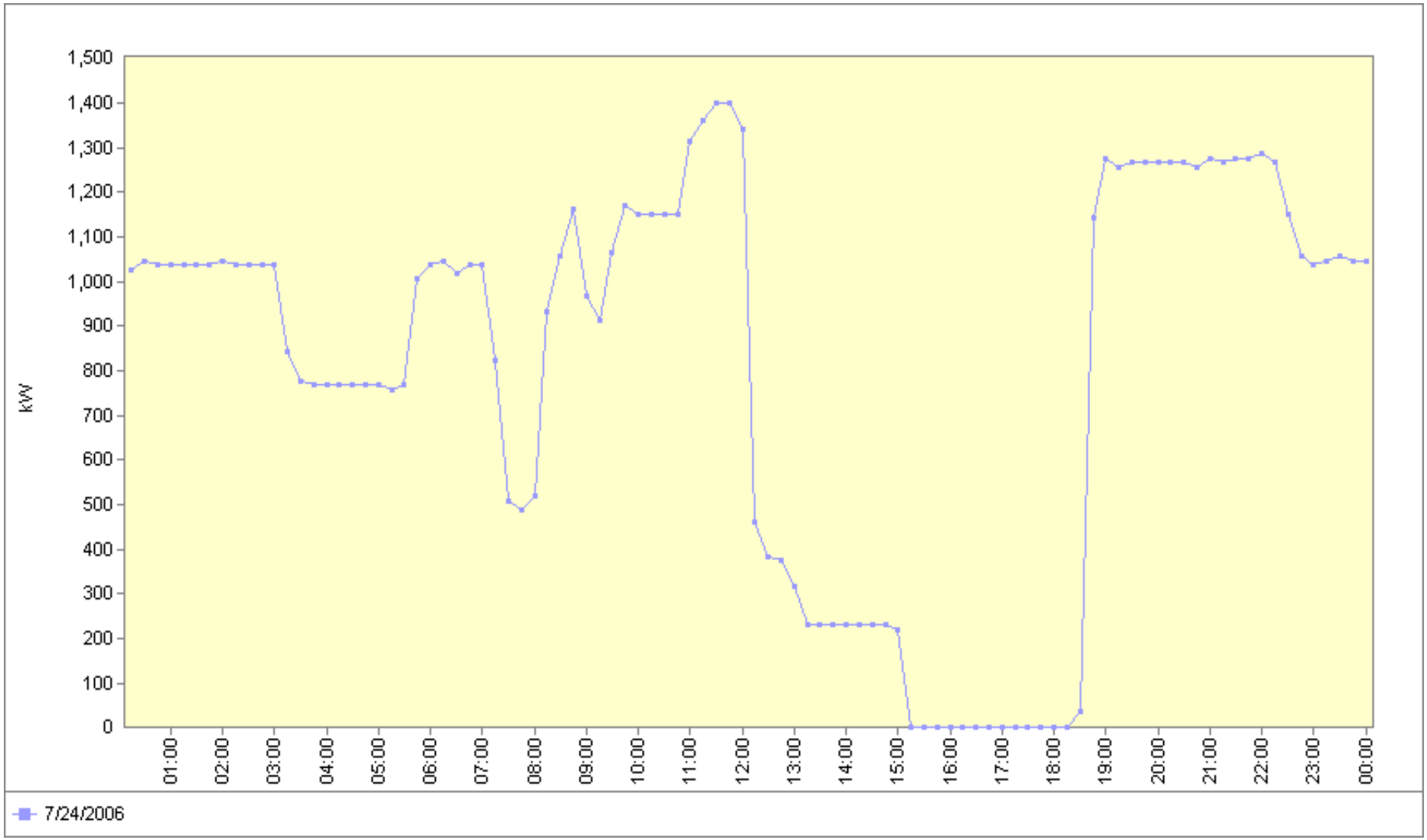
Water Agency Demand Response Fatigue

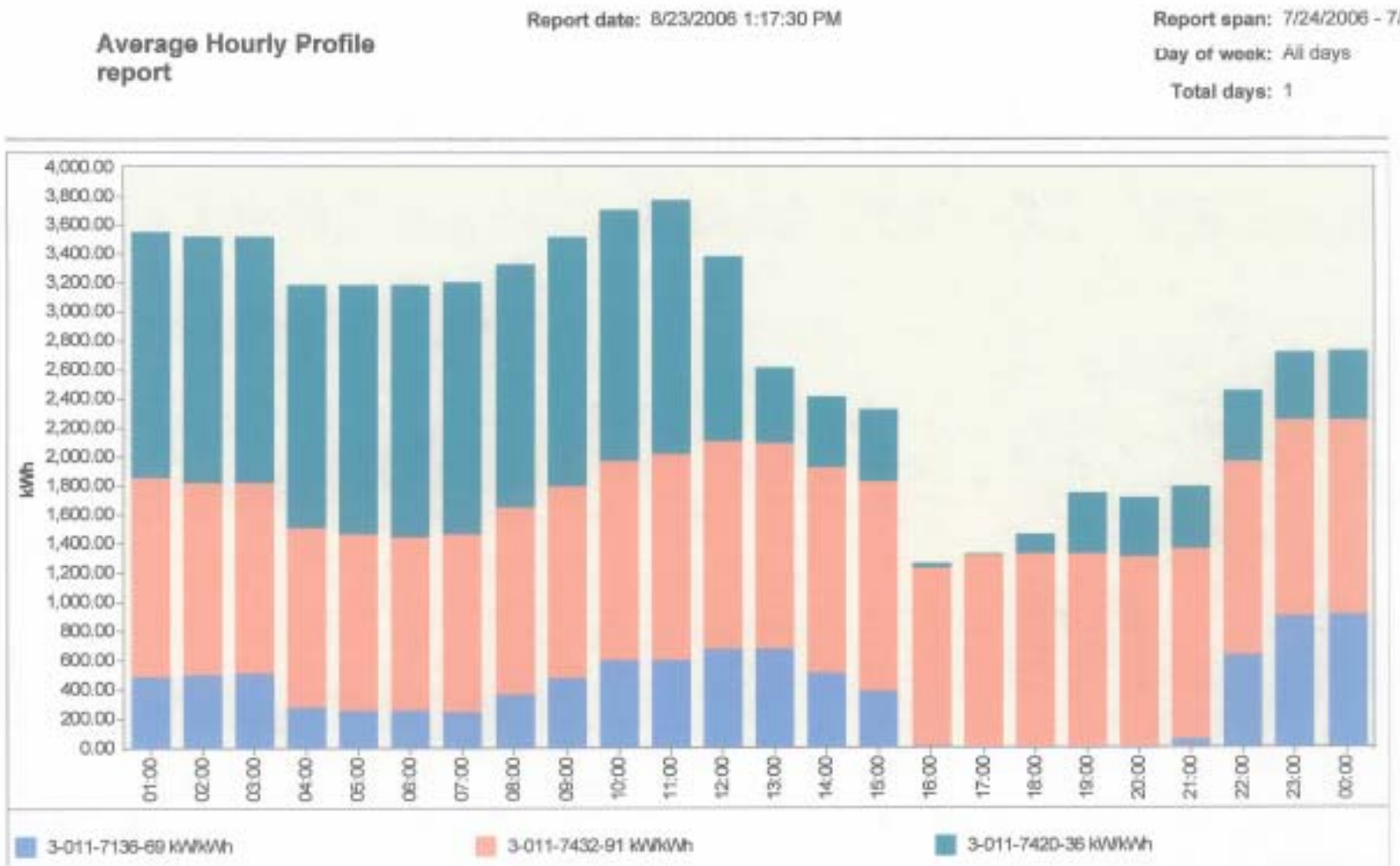
- If water agency using alternative pumping (e.g., natural gas pumps) no inherent fatigue - however, increased use of the non-electric pumps can increase their failure rate
- If using existing storage demand response fatigue does occur after multiple days
- Evapotranspiration - or how long it takes before your grass starts turning brown
  - Continuous heat increases evapotranspiration stress - increases water demand when pools are refilled and extra outdoor watering occurs

Humboldt Bay MWD

Fresh Water Facility - July 24, 2006



Eastern MWD July 24, 2006 - 3 accounts

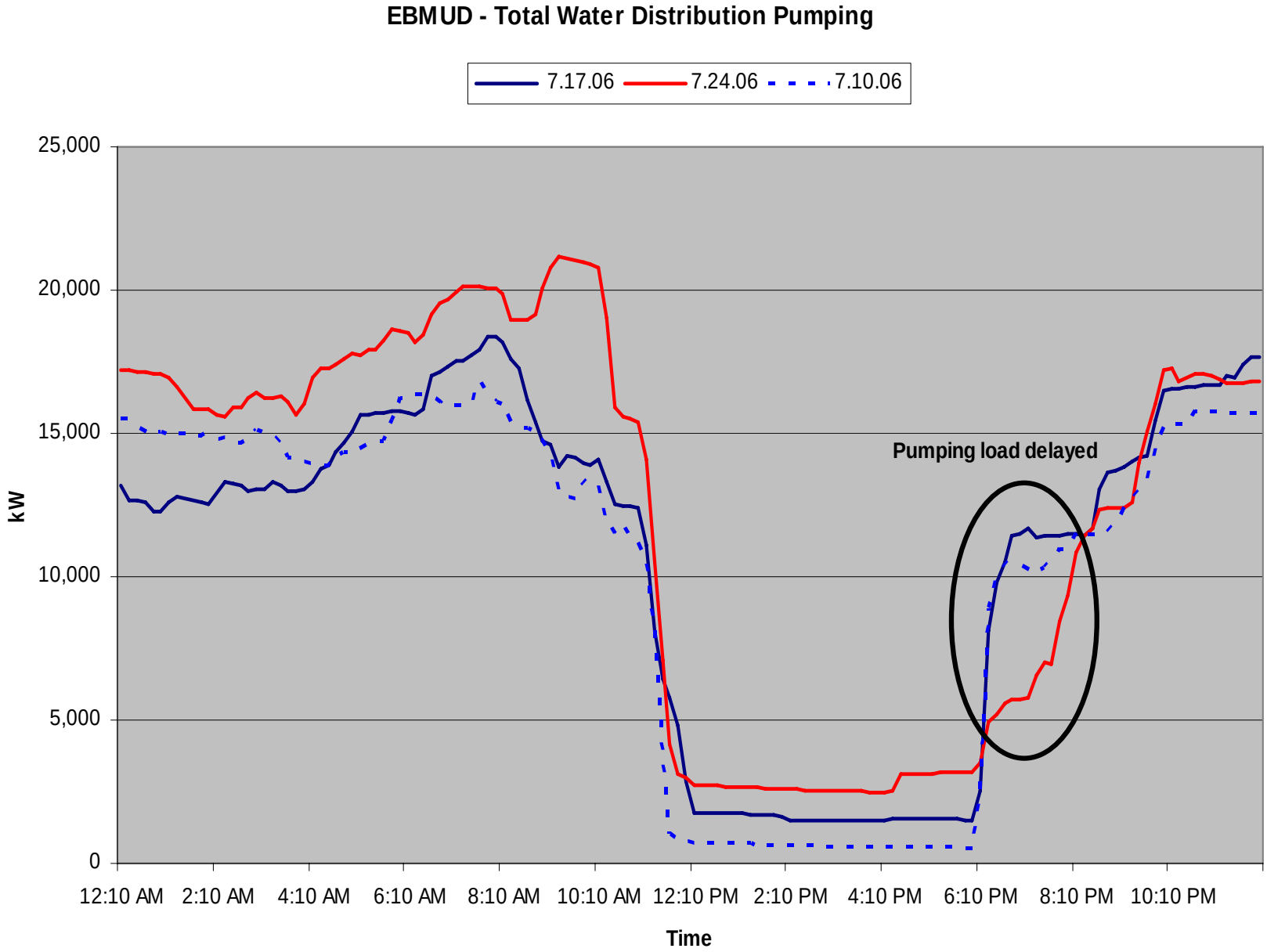


Water Agency Storage

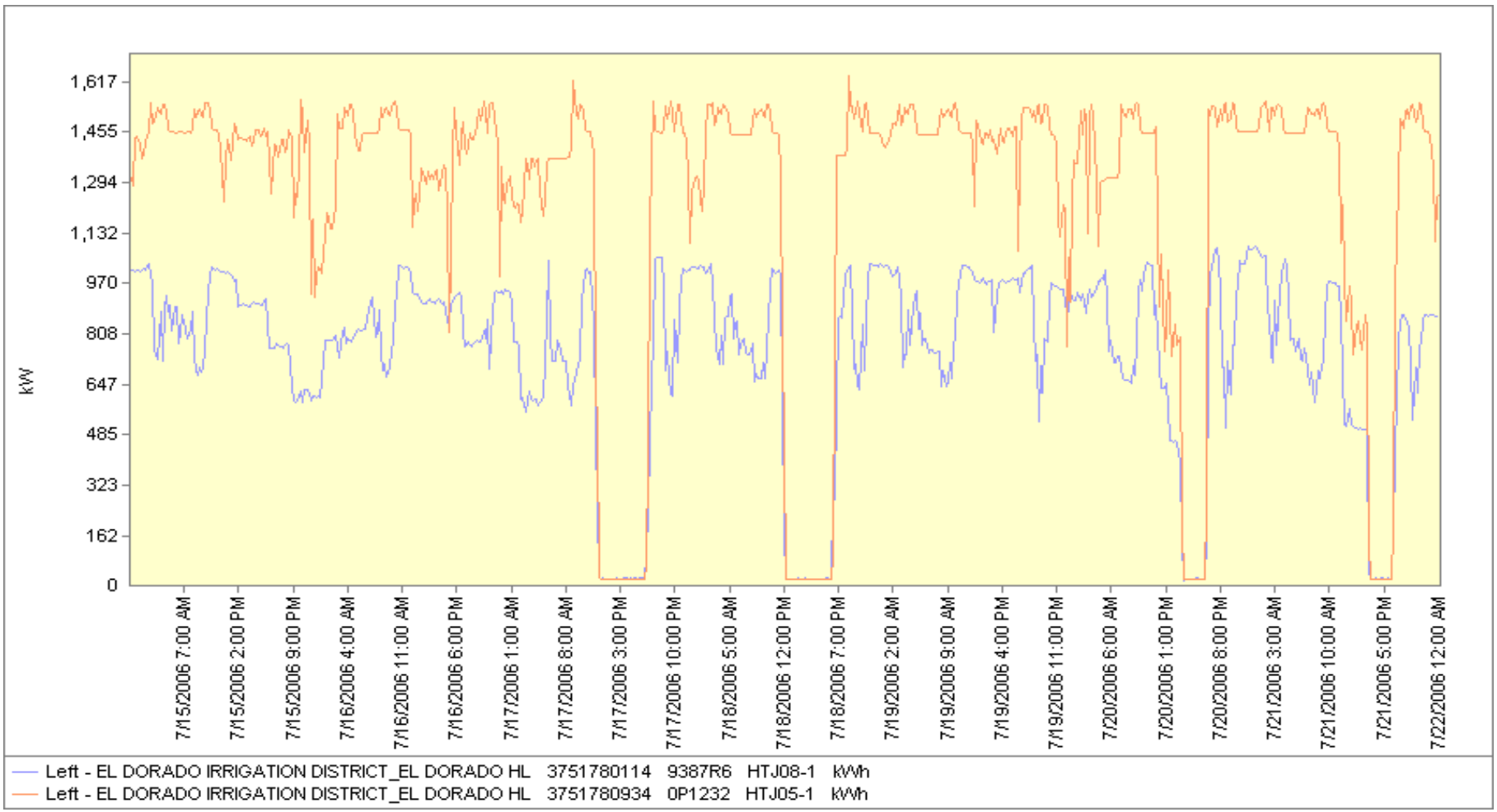
- All water agencies that supply treated water have some storage
- Storage added to optimize water system - not for on-peak electrical demand reduction
- There is a “minimal pool” of water kept in storage at all times
  - fire protection water
  - contingency water
  - water for pressure
- “A full tank is a happy tank”

Demand Response Fatigue With Storage

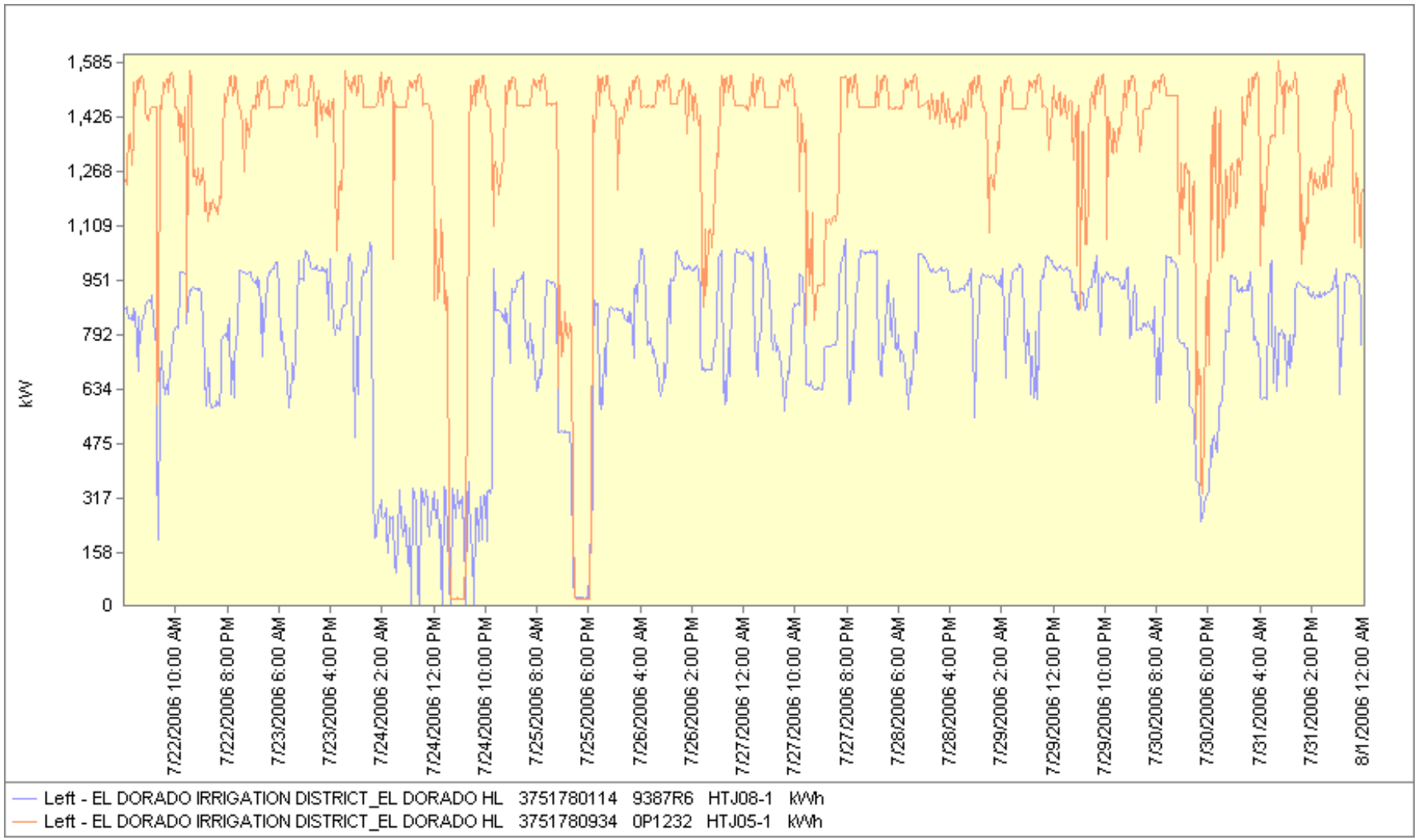
- Depends upon system - amount of storage relative to water delivery demands
- Fatigue comes from two main forces (barring some emergency)
  - refill requirements and minimum pool level
  - evapotranspiration demands
- Refill and minimum pool levels
  - water agencies can dip into minimum pool levels (particularly pressure water) occasionally if they can recover in subsequent days
    - every subsequent day of using storage and not completely refilling reduces amount of time storage only can be used
- Evapotranspiration increased water demand after multiple days
  - increase water demand drains storage faster


EBMUD - Total Water Distribution Pumping
7.17.06
7.24.06
7.10.06
25,000
20,000
15,000
10,000
5,000
0
kW
Pumping load delayed
12:10 AM
2:10 AM
4:10 AM
6:10 AM
8:10 AM
10:10 AM
12:10 PM
2:10 PM
4:10 PM
6:10 PM
8:10 PM
10:10 PM
Time

EID El Dorado Hills Raw Water and Treatment Plant - July 15-21, 2006



EID El Dorado Hills Raw Water and Treatment Plant - July 22-31, 2006



Summary

- Continuous heat days increase evapotranspiration stress - which can increase water delivery demands over normal and mean more water (pumping) needed
- Water agencies with alternative on-peak pumping options may not experience any demand response fatigue depending upon availability of alternative
- Water agencies with existing storage do experience demand response fatigue due to refill and minimum pool requirements during subsequent days and increase water delivery requirements on latter days
- If water agencies built storage for on-peak electrical reductions then fatigue factor would be moderated.

Recommendations

- Water agencies could take another 1,000 MW out of the electrical system peak period
  - allow water agencies to aggregate all accounts for demand response
  - provide incentives for water agencies to shift electrical demand out of the on peak permanently - alternative pumping, generation, more storage
    - ACWA will be filing water agency demand reductions proposals with the CPUC for multi-year program to do this
  - incentives for customers to shift water demand out of on-peak
    - CEC funded PIER project for TOU water meter demonstration